≈ Una interesante nota a propósito del cincuentenario del primer viaje de este veloz y afortunado trasatlántico en la revista "The Shipyard", nov. 1957 - enero 1958.

R.M.S
MAURETANIA

≈ Un artículo de gran elogio del "Mauretania", escrito por el Presidente de los Estados Unidos Franklin D. Roosevelt, en el nº 225 de "The Shipyard" - agosto - octubre 1959.

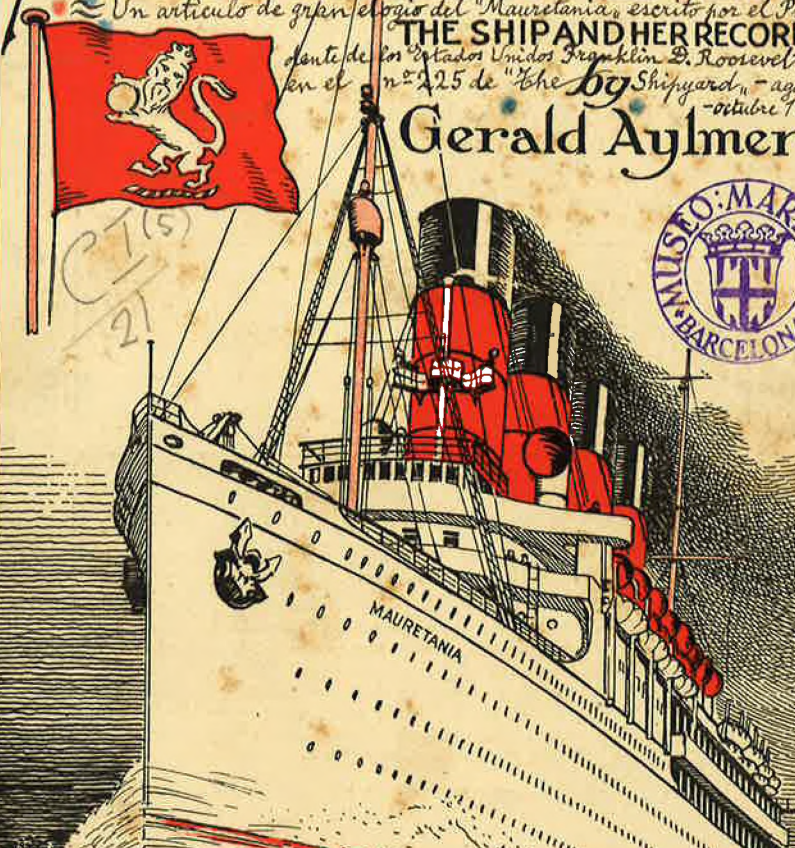
THE SHIP AND HER RECORD

by

Gerald Aylmer

MUSEO MARITIMO BARCELONA

C 7(5) / 21



1/6

PERCIVAL MARSHALL & Co. Ltd. LONDON E.C.4

“Ships and Ship Models”

A fascinating magazine for all lovers of ships and the sea, and students of nautical history. Full of beautifully illustrated articles on ships and models of all periods. Sail and steam. Everybody interested in ships, old and new, should have this magazine regularly.

Published monthly. Price 6d. *Single copies, post free,* 7d.

PERCIVAL MARSHALL & CO., LTD.
66 Farringdon Street, London, E.C.4

“The Model Engineer and Practical Electrician”

Recognized for over thirty years as the authoritative journal on model making, and on experimental engineering and electrical work. It is a valuable aid to technical education and research, and a competent guide to workshop equipment and methods. Fully illustrated with interesting photographs and helpful drawings. Hundreds of bargains in tools and models advertised weekly.

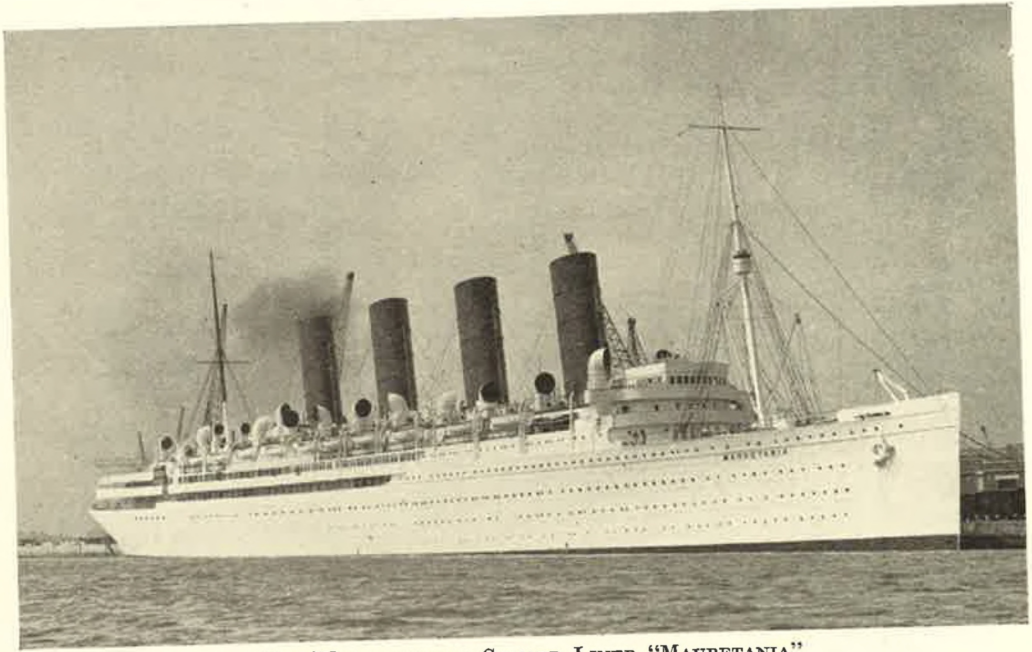
Published every Thursday. Price 4d. *Single copies, post free,* 5d.

PERCIVAL MARSHALL & CO., LTD.
66 Farringdon Street, London, E.C.4

R.M.S.

"MAURETANIA"

The Ship and Her Record



THE WORLD-FAMOUS CUNARD LINER "MAURETANIA"
In her cruising colour—1934

R.M.S.
"MAURETANIA"
THE SHIP AND HER RECORD

BY

GERALD AYLMER

Illustrated

MUSEO MARITIMO BARCELONA

José Mª de Gavaldà Cabré

LONDON
PERCIVAL MARSHALL & CO. LTD
66 FARRINGDON STREET, E.C.4

~ Artículo, notas e ilustraciones acerca de las reformas que se introdujeron en el "MAURETANIA„ después de la Guerra Mundial de 1914-18, en "Shipbuilding and Shipping Record„, n.os 16 y 23 marzo 1922. = Otras vistas del "Mauretania„ en el nº de 12 mayo 1921, 578-9. = El famoso galgo del Océano camuflado durante la Guerra de 1914-18: vistas del buque (y de varios otros) en el curso de sus servicios como transporte y barco-hospital, nº 25 sepbre. 1919. - × "Olympic„ - = Pequeño incendio en el "Mauretania„, nº 4 agosto 1921, pág. 155.

DEDICATED

TO

THOSE WHO LOST THEIR LIVES

IN

HER GREAT SISTER-SHIP

THE

LUSITANIA

MAY 7TH, 1915

La veterana revista "The Syren and Shipping„, en su nº de 24 junio 1942, dió cuenta del fallecimiento del capitán del "Mauretania„ - último que tuvo tan famoso trasatlántico - A.T. Brown. Hizo sus navegaciones a vela, obtuvo el certificado de capitán en 1905 y falleció a la edad de 64 años. Ingresó en la Cunard Co. como junior officer y, después de los correspondientes ascensos, se le dió el mando del "Carmania„ en 1919. Desde marzo de 1921 hasta octubre de 1923 mandó el "Mauretania„ - exceptó durante un corto periodo en que se le confió el "Aquitania„ -, y también fué designado para que condujese al viejo y glorioso "Mauretania„ en su último y triste viaje desde Southampton a Rosyth, en 1935, para ser desguazado. En 1924 diósele el mando del trasatlántico "Ausonia„, y sucesivamente mandó luego el "Saxonia„, "Lancastria„, "Andania„, "Verbania„, "Ascania„, "Carinthia„ y "Franconia„. En 1936 y durante un viaje redondo, volvió a mandar el "Aquitania„ y luego pasó a la motonave "Britannic„. Cuando el nuevo "Mauretania„ entró en servicio, en 1939, fué enviado a él, y entre el mando de este buque y el del "Britannic„ pasó los postreros años. En 1941 el Rey le otorgó la cruz de la Orden del Imperio Británico (O.B.E.) con ocasión de su cumpleaños, por los servicios prestados durante la guerra. ~

Printed in Great Britain by
UNWIN BROTHERS LIMITED, LONDON AND WOKING

R. 8472

~ Numerosas notas acerca del fin del "Mauretania„ (venta para el desguace, subasta de objetos, vidriera (nº 13 junio, 654) que lo representa para una catedral inglesa, solicitud del público, etc.), en "Shipbuilding and Shipping Record„, y nº 21 marzo y en meses de abril, mayo, junio, etc. de 1935. ~ Modelo del "Mauretania„ para la "capilla de los marineros„ de la Catedral de Winchester, "S.&S.R.„, 25 Julio 1935, 96: tiene 15 pies de eslora y pesa alrededor de dos toneladas. ~ El Presidente Roosevelt ha pedido que un modelo del "Mauretania„, de 18 pies, para la Smithsonian Institution de Washington ("The Engineer„ - Julio 1º Ag. 1935) ~ Este buque memorable reproducido en una vidriera de la catedral de San Nicolás, de Newcastle-on-Tyne, revista "Mar„, nº Junio 1935, pág. 137. = Sir George B. Hunter ofreció después de la reforma de que se hizo objeto al "Mauretania„ en 1921, dos esculturas, que representaban Britania y Columbia, para los nichos del salón principal. Preguntado por la Compañía Cunard, antes del desguace, si quería conservarlas, contestó afirmativamente.

CONTENTS

PAGE

FOREWORD 6

CHAPTER

I. WHY THE "MAURETANIA" WAS BUILT . 7

II. THE SHIP AND HER MACHINERY . . . 17

III. LAUNCH AND TRIALS 28

IV. PRE-WAR SERVICES 36

V. POST-WAR SERVICES 45

VI. TWO MEN OF THE "MAURETANIA" 56

~ La campana del "Mauretania„ es regalada por Sir Percy Bates a la iglesia de la nueva colonia agrícola de Storeton, Wirral: "S. & S. Record„ - 29 Oct. 1936, pág. 514 (breve nota).

~ Dos tristes vistas del desguace del "Mauretania„, en "Transactions of the Institute of Marine Engineers„, en la pág. 275 del nº de septiembre de 1936. - En "S. & S. R.„ habrá, probablemente, otras.

~ Fué vendido para ser desguazado, en abril de 1935, a unos ship breakers ingleses por la suma de £ 78.000 (a 50 s. 10 d. por ton. de registro bruto y a 50 s. 8 d. por tonelada desplazamiento).

FOREWORD

THE object of this book is briefly to describe the *Mauretania* and her great achievements while she is still in being. A ship who when well passed middle age has not only beaten her early speed records, but has put up performances which in their brilliancy are comparable with those of the super-liners of but yesterday.

Future generations will undoubtedly regard the grand old *Mauretania* as the *Cutty Sark* of the steam era.

The author's thanks are due to the Cunard Company, who have kindly supplied some valuable authentic data as to her voyages and all the illustrations, and to the Editor of *The Engineer*, who willingly granted access to those numbers which dealt with her construction and launch.

G. A.

R.M.S. "MAURETANIA"

CHAPTER I

WHY THE "MAURETANIA" WAS BUILT

THE Cunard Steam Ship Company has long ceased to be merely a limited liability company; it has become part of the British Constitution! Though not quite the oldest British shipping company now existent, it is by many years the oldest of those running on the North Atlantic. Throughout its long career it has always ranked as one of the leading—if not the leading—of the many British shipping companies and has always maintained a distinctive individuality, never having been associated with any international combine or trust.

It takes its name from that of its founder, Mr. Samuel Cunard, born in Halifax, Nova Scotia, on November 21, 1787, who commenced his shipping career with his father in the joint ownership of several small sailing ships carrying the mails between Halifax and Newfoundland, Boston and the Bermudas, to which was added later the business of local agent for the Honourable East India Company.

For many years Cunard had the firm conviction that a regular and frequent transatlantic steamship service would not only prove feasible but financially successful. On hearing that the British Government were desirous of conveying the Canadian and American mails by steam instead of by sail as hitherto, he realized that his great opportunity had arrived.

He came to England to enlist support for his scheme and obtained from the Secretary of the East India Company in London an introduction to Mr. Robert Napier, of Glasgow, the leading marine engineer of the day. Mr. Napier passed him on to Messrs. George Burns and David McIvor, and eventually the three decided to submit a tender to the Government. This was accepted and on May 4, 1839, the company was formed with a capital of £270,000, known at first as the British and North American Royal Mail Steam Packet Company, soon to be shortened to its present title. On July 4, 1840—Independence Day—their first ship, the *Britannia*, left England for Halifax with the mails, under the command of Captain Woodruff and with Mr. Cunard on board. Ten years later the American terminus of the mail service was altered to New York.

For many years following its inception the line remained the property of the three original founders, but on February 22, 1870, it was incorporated as a private limited liability company, and in 1880 was floated as a public company with a capital of two millions, the shares being eagerly taken up.

On March 9, 1859, Queen Victoria conferred a baronetcy on Samuel Cunard in recognition of what he had accomplished for British shipping. He died at his London residence, 26, Princes Gardens, Kensington, on April 28, 1865.

The history of the Cunard from its earliest days has been one of steady progress. A wonderful reputation was created for punctuality, clockwork regularity of shipboard routine, and, above all, safety. It is a remarkable fact that, excluding war-time, no mishap has ever occurred to any of the Company's vessels involving the life of a passenger. The fleet has included, in addition to those we mention later, such well-known vessels as the *Persia* of 1856; the *Scotia* of 1863; the elegant *Russia* of 1867; the *Gallia* of 1879; the *Servia* of 1881; the first *Aurania* of 1883, which brought home the City of London Imperial Volunteers (C.I.V.s) from the South African War; the *Carpathia* of 1903, which made that great run to the stricken *Titanic*, only to find the laden boats, and the turbine-driven, very handsome *Carmania* of 1905, famous for that epic duel with the German armed liner *Trafalgar* on September 14, 1914.

In order to clearly explain what led to the construction of such epoch-making vessels as the *Mauretania* and *Lusitania* it is necessary to briefly delve into the previous steamship history of the North Atlantic route.

In 1884 there appeared the Cunard's first pair of historic record-breakers, the *Etruria* and *Umbria*, which immediately captured the Blue Riband and held it until the advent, in 1889, of the Inman Company's equally famous pair, the *City of Paris* and *City of New York*. Close on the heels of the latter came the very fine *Majestic* and *Teutonic*, built to the order of the White Star Line. As these six vessels were not only well known in their day but well remembered for many years after, we give their leading particulars, which particulars are not only of historic interest, but provide a basis for comparison with those of the *Mauretania* given later.

The *Etruria* was the first vessel built that earned the distinction of crossing the Atlantic at an average of 20 knots, and her and the *Umbria's* best voyages were made at an average of 19¾ to 20 knots. The later twin-screw Inmans and White Stars were slightly faster, as would be expected from their greater size and increased horse-power, and the keenest rivalry always existed between the four, but it was generally allowed that the Inman's most elegant *City of Paris* was the fleetest. Their best voyages were done at an average of 20·35, 20·4, and 20·6 knots. These six liners can well be regarded as the pioneers of the modern era on the North Atlantic route.

But the Directors of the Cunard were determined to regain the premier position for their line and they placed an order with the Fairfield Shipbuilding and Engineering Company of Glasgow for their second famous pair, the *Campania* and *Lucania*, particulars of which are also given on page 13. They represented a great advance in progress, both as regards the excellence of their accommodation, the number of passengers carried, their size, and their useful turn of speed, and they proved two of the most reliable and popular vessels which ever crossed the Atlantic. They presented a most impressive appearance of power and speed, which was accentuated by their two towering, widely-spaced funnels, 19 feet in diameter and 120 feet in height from the boiler grate level.

Their machinery consisted of two triple-expansion, five-cylinder, three-crank sets, one on each shaft, each with two high-pressure cylinders of 37 inches diameter, one intermediate of 79 and two low-pressure of 98 inches with a 69-inch stroke, the total designed horse-power being 30,000. Steam was supplied by twelve double-ended and two single-ended boilers, which at full power consumed about 500 tons of coal per day.

Their speed was in keeping with their other noble qualities. On the *Campania's* trials in April 1893 a mean of 23·2 knots at 31,050 horse-power was attained. During the *Lucania's* second voyage she made a record day's run at the rate of 23·3 knots, and in May 1895 did an Easterly crossing at the excellent average of 22·01, the highest speed for a voyage ever reached by either. According to particulars published by the Cunard Company, their best passages were done at an average of:—

	Lucania	*Campania*
	Knots	Knots
Westward ..	21·81	21·59
Eastward ..	22·01	21·88

Throughout their careers the *Lucania* always proved the more speedy, but only by a small margin.

Only the *Campania* survived until August 1914, and she had actually been stood off for breaking up. She was requisitioned by the Admiralty, converted into a seaplane carrier, attached to the Grand Fleet, and as such served throughout the war. That she would go to the shipbreakers on the conclusion of hostilities was a certainty, and it appeared impossible that she could escape that indignity. But it was as if some marine deity had ordained her end, for it could not have been better for such a grand old ship, after having so faithfully and conspicuously served first her company and then her country, for a quarter of a century, to close her career in harness and at such a time. She was accidentally rammed by H.M.S. *Revenge* in the Firth of Forth only a few days before the Armistice was signed, but, well-bred as she was, she died as stoutly and as honestly as she had lived, and her strong construction enabled her to keep afloat for some hours, so that not a single life was lost.

The advent of the *Campania* and *Lucania,* with their comfortable margin of speed, put a damper on any immediate British competition. But a challenge came from a new quarter. The growth of the two great German shipping companies, the North German Lloyd and the Hamburg-America, had been very consistent, and in the mid-nineties the former decided to win for themselves and Germany the great distinction of possessing the fastest ocean steamship in the world, the *Kaiser Wilhelm der Grosse.*

The Hamburg-America replied with the *Deutschland* of 1900 and then retired from the speed contest. The North German Lloyd then embarked on a very ambitious programme, namely, to immediately order two more express liners and possibly a third, so as to maintain a weekly fast service between Germany and the United States. During 1901 the *Kronprinz Wilhelm* was completed, and in 1903 the famous *Kaiser Wilhelm II,* and so successful did the latter prove that another was ordered to practically the same specification, the *Kronprincessin Cecillia,* completed in 1907. The leading particulars of these fine vessels, together with those of the *Mauretania,* are given on page 13.

The particulars of the *Kronprincessin Cecillia* are practically identical with those of the *Kaiser Wilhelm II,* except a slightly increased boiler capacity.

As to their speed. They all showed a distinct advance on that of the two Cunarders, the *Campania* and *Lucania.* In spite of the increase of horse-power there was only about three-quarters of a knot difference between the best speeds of any of the German "big five," the *Kaiser Wilhelm der Grosse* being the slowest

	Date	Length	Beam	Gross Tons	Indicated Horse Power	Steam Pressure, lb.	Heating Surface, sq. ft.
Etruria	1884	500	57	8,127	14,500	110	39,000
Umbria							
City of Paris	1889	528	63	10,500	20,000	150	45,000
City of New York							
Teutonic	1890	565·2	57·8	9,984	17,000	180	40,970
Majestic							
Campania	1893	601	65·2	12,950	30,000	165	82,200
Lucania							

	Date	Length	Beam	Gross Tons	Indicated Horse Power	Steam Pressure, lb.	Heating Surface, sq. ft.
Kaiser Wilhelm der Grosse ..	1897	625	66	14,350	30,000	178	84,285
Deutschland	1900	662	67	16,500	36,000	220	85,468
Kronprinz Wilhelm	1901	640	66	15,000	36,000	213	93,685
Kaiser Wilhelm II	1903	678	72	20,000	40,000	225	107,643
Mauretania	1907	762	88	31,938	68,000	195	157,520

COMPARISON OF R.M.S. "MAURETANIA" WITH OTHER FAMOUS SHIPS with a maximum of 23 knots and the *Kaiser Wilhelm II* and the *Kronprincessin Cecillia* the fastest, the highest average speed which was attained by any being that of the former in June 1904, a voyage at an average of 23·68 knots. The Hamburg-America's sole representative, the *Deutschland*, was slightly faster than the *Kaiser Wilhelm der Grosse* and for a time a great rivalry existed between her and the later *Kronprinz Wilhelm*, but the latter eventually proved the superior.

But it was in their accommodation and comfort, in addition to their speed, that these German vessels excelled. The two Teutonic companies had always enjoyed a very high reputation for such, especially as regards the catering department, and it was surpassed in these large expresses. Their owners aimed at securing the cream of the wealthy European and American passenger traffic, and in order to do so they inaugurated a new vogue of luxury in liners which has since been carried to such inordinate lengths. The first-class cabins, recreation rooms, and dining saloons were most sumptuous, while gymnasiums, verandah cafés, and palm courts abounded. The second-class, and even the steerage, were not neglected, staterooms being provided for the former. The German nation was very proud of these vessels and had every cause to be. As regards their technical equipment as high-speed steamships, their appointments as floating hotels and their appearance, with their two raked pole masts and four buff-coloured funnels arranged in pairs, they eclipsed anything previously achieved.

Thus by 1903 Germany possessed the four fastest and best appointed merchant ships afloat, with another on order. This state of affairs was not palatable, to put it mildly, to Britain, a country which had always prided itself on its steamship construction and speed. But apart from the question of loss of national prestige there was the very practical one of the loss of traffic, especially from the United States, whose citizens always wished not only to "get there," but in the quickest time possible!

It had always been proved that the holding of the Blue Riband of the Atlantic was not an empty honour. It gave the company concerned a prominence in the eyes of the travelling public and in consequence invariably attracted an amount of traffic beyond that which the particular record-breakers actually carried.

But the difficulty with which any British company had to contend was that the German companies were very heavily subsidized by the German Government, and the German nation at that time, under the patriotic leadership of their Kaiser, believed in a great Germanic future on the sea. For an ordinary commercial company, however powerful as such they may be, to pit itself against the resources of a wealthy state was a very serious question.

The British Government of the day, no doubt stirred by the unmistakable public opinion on the subject and alarmed at the encroachment made on British tonnage by Mr. Pierpoint Morgan's American International Mercantile Marine combine, wisely decided to abandon the usual Government policy of holding aloof from any interference in the shipping industry. A Government inter-departmental advisory Committee was appointed and as the result of its report an agreement was made with the Cunard Company whereby consequent on the construction of two large vessels a loan of two and a half millions was granted, together with an annual subsidy of £150,000. The Government in return stipulated for a speed of 24½ knots in moderate weather, safeguards as to the continued British nature of the Company, and the power to exercise certain rights as to the vessels in the eventuality of war.

These preliminary financial arrangements having been satisfactorily settled, the question arose as to which firms had the necessary facilities, equipment, and experience to successfully carry out such work, the magnitude of which was far and away greater than anything that had hitherto been attempted.

The choice did not lay amongst many, and eventually orders were placed with Messrs. Swan, Hunter & Wigham Richardson, of Wallsend-on-Tyne, for the *Mauretania*, and with Messrs. John Brown & Company, of Clydebank, for the *Lusitania,* both firms having already done a considerable amount of work for the Cunard. The latter firm was the well-known Sheffield concern, renowned for their manufacture of armour, and who in 1899 had purchased the shipbuilding works of Messrs. J. and G. Thomson, the builders of many famous vessels for the Royal Navy and Merchant Service since their establishment in 1873.

CHAPTER II

THE SHIP AND HER MACHINERY

As to her name. With very few early exceptions it has always been the custom of the Cunard Company to give their vessels names ending in "ia." In many instances the names had been previously borne by a company's vessel, the present *Aurania*, for instance, being the third Cunarder of that name. But the huge twins of 1906 were evidently deemed worthy of entirely new names, which in their length and resonating cadence should befit the grandeur of the ships they designated.

Mauretania was the name given in early times to an extensive part of North Africa, so named from the chief tribes which inhabited it, the Mauri or Maurusii. The territory came under Roman rule from the year 42 and the Emperor Claudius constituted Mauretania as one of the principal Roman provinces, which conferred certain civic and other rights. It was subdued by the Vandals in 429; the Greeks in 533, and the Arabs in 680. Lusitania was the name of a Roman province corresponding more or less with the modern Portugal.

The leading particulars of the *Mauretania* are:—

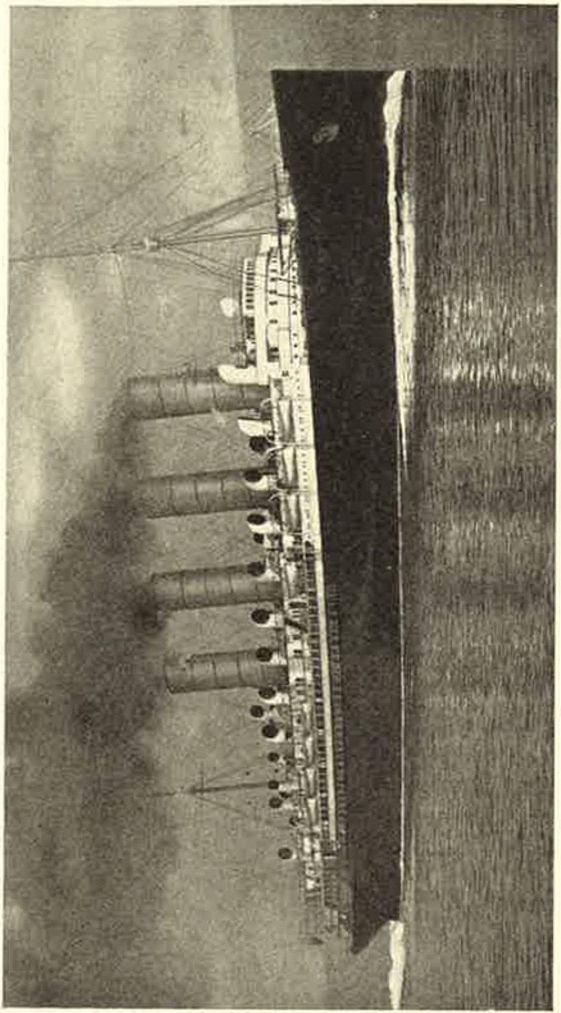
Date of launch	September 20, 1906
Date of trials	November 3, 1907
Date of first voyage ..	November 16, 1907

Length—	
Extreme	785 feet
Between Perpendiculars	762 feet 2 inches
Beam	88 ft
Depth in hold	57 feet
Gross tonnage	31,938
Designed shaft horse-power	68,000
Designed speed	25 knots
Passenger accommodation—	
First-class	560
Second-class	475
Third-class	1,300
	2.[illegible]35
Complement—	
Navigation	70
Engineering	369
Hotel	827
	1.266

The dimensions are as given in the Board of Trade Mercantile Navy List and the passenger accommodation and complement as when built. The proportion of first-class accommodation was increased when the American quota system restricting immigration became operative and the engineering personnel was considerably affected when she was converted to oil fuel after the war.

The *Mauretania* has seven decks, of which four—the lower, main, upper, and shelter decks—are continuous. The promenade and boat decks extend for most of the length of the ship, the former being 450 feet long, and a morning's constitution of three and a half times round this is equivalent to one mile. The boat deck above is not quite so spacious, but for those who prefer it would be decidedly more airy, being about 60 feet above sea-level.

A very important factor in the safety of a large



R.M.S. "Mauretania" on Trials on the Clyde, 1907 liner is that of water-tight subdivision, which was very thoroughly devised for the *Mauretania.* She has fifteen principal water-tight bulkheads extending upwards to above the water-line, and altogether one hundred and seventy-five separate water-tight compartments large and small. Of the most important water-tight doors thirty-eight can be closed simultaneously by the control lever on the bridge, which brings into operation the hydraulic door-closing mechanism brought to such a state of perfection by Messrs. Stone & Company, of Deptford.

That unseen but most important item, the rudder, is of the balanced or " barn door " pattern, suspended for two-thirds of its depth. It is built up of three castings bolted together, has an area of 420 square feet, and weighs 65 tons.

A book by itself could be written on the details of the construction of the *Mauretania* and the means adopted to safeguard against the enormous strains to which such a huge structure would be subject. To-day the problem would not be considered as so exceptional, but it must be emphasized that both the *Mauretania* and *Lusitania* in their size and power were more in the nature of an innovation than a step in evolution. A description of the constructional work would prove too technical to be of general interest, but a faint idea of the task involved can be gauged by the fact that the rivets used varied from half an inch to 8 inches in length and $2\frac{3}{4}$ lb. in weight and numbered approximately four million.

As to her appearance. A reference to any of the illustrations in this book will convey far more than pages of description could do. Be as critical as one may there is nothing that offends the eye. Two distinctive features are at once apparent, namely, the four tall, well-raked, evenly-spaced funnels, so different from the latest squat affairs, and the absence of deck upon deck of top-hamper amidships, which gives to so many modern ships the appearance of a block of tenement dwellings that had somehow slid off the land.

The long graceful sweep of her lines gives an impression of speed and of a greater length than she actually has, and her stern is of the elegant " counter " design and not the ungainly so-called " cruiser " stern so much in vogue to-day. The *Mauretania*, the *Aquitania*, and the *Olympic*, all of somewhat similar appearance, while outclassed as they may be in certain other respects, are credited with being by far the most elegant of the large liners running to-day.

With regard to her passenger accommodation. The ideas on the subject which existed in 1906 have varied very considerably since, say, 1920, and the Cunard are to be congratulated on the many additional attractions provided. So much so that in spite of her age she can well stand comparison with even the very latest super-luxurious liners on the Atlantic route.

An outstanding feature of her present passenger accommodation is a double-tiered restaurant, decorated in the François Premier style, with its massive door and exquisite carvings, one of the most striking public rooms to be found ashore or afloat.

The smoking-room in the *Mauretania* is another conspicuous example of the art of British craftsmen. This room is richly panelled in walnut, panels of selected pieces being framed in discreet inlay and carvings. The room is provided with recesses and alcoves for quiet card games and conversation.

Machinery.—As this book has been written more for the general public and not for the engineer or marine architect it has been considered unnecessary when dealing with the machinery of the *Mauretania* to give too much technical detail. Much of the information that is given is taken from what was published at the time of her construction and still holds good, but it should be understood that certain of her mechanical equipment, especially as to her boiler installation and condensers, has been considerably improved and is rightly regarded by the Company as to a certain extent confidential.

The agreement with the Government stipulated for an average sea speed of 24½ knots in moderate weather. To maintain this a surplus had to be allowed for in case time had to be made up. To drive these huge vessels at such a speed would entail an enormous horse-power, somewhere in the region of 70,000, a clear 30,000 more than the most powerful hitherto installed afloat, i.e. that of the 40,000 indicated horse-power of the *Kaiser Wilhelm II* of 1903.

All previous express Atlantic liners had machinery of the well-tried reciprocating type, but for reasons into which we need not enter it had become obvious that this had commenced to reach its utmost limit of development, unless some very radical alteration of design or principle could be adopted.

Although the turbine drive had been tried out in the Navy and in a previous, moderate-speed Cunarder, the *Carmania*, yet the conditions were now somewhat different. The Company appointed a Committee of technical experts to consider the question of the propelling machinery, and they reported in March 1904 that the turbine principle was not only desirable but that there appeared no practical alternative. It had to be to a certain extent a leap in the dark, but the Cunard took it and in the magnificent performances of the *Mauretania* and *Lusitania* they received a well-deserved reward for their boldness.

Very briefly, the turbine is a rotary engine with no reciprocating parts whatever. Steam at a high velocity impinges on a number of blades fixed round the outside of a large drum, termed the rotor, causing it to revolve at a high speed. The spindle of the rotor is fixed to the inboard end of the propeller shaft, either directly—as in the *Mauretania*—or through gearing.

Owing to the great horse-power necessary the question arose as to the number of shafts and propellers. It was considered by experts that the maximum to be transmitted by one shaft should not exceed 20,000 horse-power. The *Mauretania* was, therefore, given quadruple screws, the first Atlantic liner to be so fitted. She has two high-pressure turbines on the two outer shafts, the steam from which expands into two larger low-pressure turbines on the two inner shafts, and from them passes to the condenser to be converted into water again for the boilers. Owing to the angle at which the rotor blades have to be fixed a turbine cannot be run in the reverse direction and an additional astern turbine is fitted on each of the inner shafts.

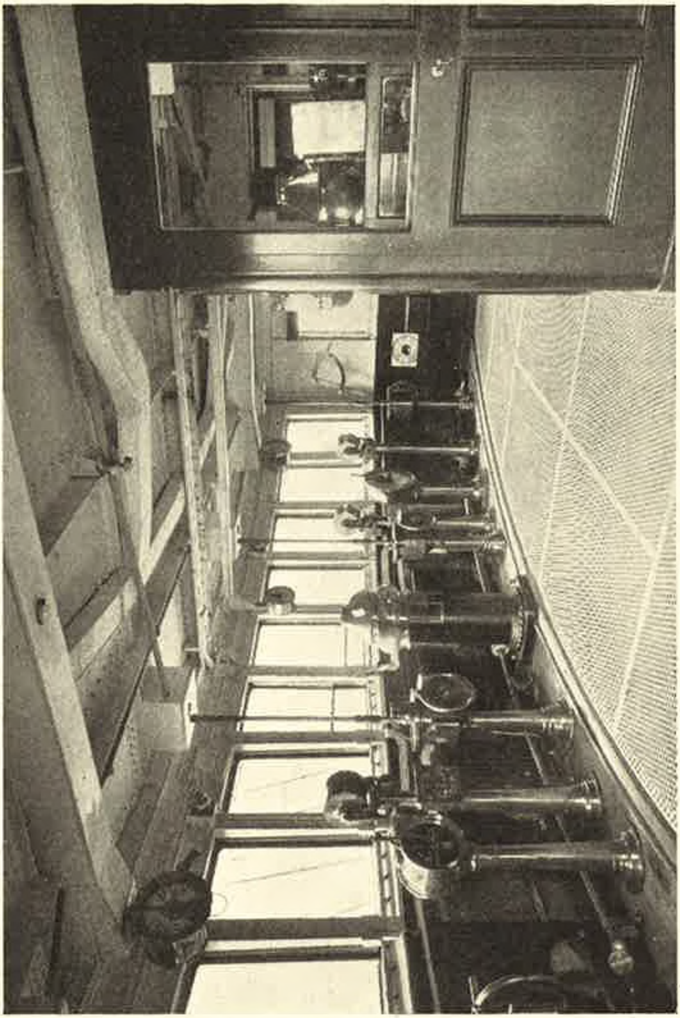
Each of the high-pressure turbine rotors are 8 feet in diameter and weigh 72 tons, the low-pressures being 11 feet 8 inches in diameter and weigh 130 tons. The blades are not uniform in size, but vary in length from 2¼ to 22 inches, to meet with the greater volume of the steam as it expands. A faint idea of the work involved in the construction of such large turbines can be obtained when we say that the blades contained in the turbines of the *Mauretania* number no less than three million.

Boilers.—To supply the enormous quantity of steam a large boiler installation was necessary. The *Mauretania* has twenty-three double-ended and two single-ended boilers, each of the former being 17 feet 3 inches diameter by 21 feet long, with eight furnaces to a double-ended boiler, or 192 furnaces in all. The collective heating surface of the boilers is 157,520 square feet and the grate area 4,068 square feet. Steam is generated at a pressure of 195 lb. per square inch, being reduced at the turbines to 160 lb.

There are four boiler-rooms, separated by watertight bulkheads, which extend to the upper deck. To each boiler-room is a funnel, which are elliptical in order to reduce wind pressure, the dimensions being 26 feet long by 19 feet in width, and the top of the funnels is 155 feet above the keel and 120 feet above the normal load line.

The total weight of the propelling machinery and boilers, together with their accessories, was given at the time of her construction as 9,400 tons, just a shade under the total weight when ready for sea of a modern 10,000-ton cruiser built up to the Treaty limit. To which weight should be added an oil-fuel storage of 5,000-odd tons.

Condensers.—It is probably well known that seawater cannot be used for steam-raising purposes as the brine would have a very bad effect on the boilers. Therefore, chiefly for this reason the steam, after it has done its work in the turbines, is converted into water by means of the condenser, the principle of which is that sea-water is constantly circulated round pipes containing the steam, thereby lowering its temperature until it again becomes liquid. The



The Bridge of R.M.S. "Mauretania"

cooling surface of the *Mauretania's* condensers as originally constructed was in the region of 82,800 square feet, and the amount of circulating water required was enormous, approximately 450,000 tons every 24 hours, or 312 tons every minute. This is equivalent to 100,800,000 gallons per day, which at the very liberal allowance of 35 gallons per person would be sufficient for a city with a population of three millions, about that of Paris, for example.

Electricity.—As can well be understood, the amount of electricity required by the *Mauretania* is very considerable, equivalent to that for a moderate sized town. When she was constructed generating plant was installed consisting of four steam turbines coupled direct to dynamos rated at 375 kilowatts each. All this current is not required for lighting as electricity is very extensively used throughout the ship for power in connection with ventilating, pumps, lifts, etc., and also for cabin heating and cooking purposes. It was estimated that 150 miles of electric cable was installed, but this quantity has been exceeded as electricity is now used more extensively than ever.

Distillers and Evaporators.—The amount of fresh water that a large liner requires per day runs into thousands of gallons. The *Mauretania* is fitted with distilling apparatus to supply 18,000 gallons in the 24 hours for cooking and drinking and 15,000 gallons for washing. Evaporators are also necessary for feed-make-up purposes in connection with the boilers, and these installed are sufficient to supply 350 tons per day.

Electric Lifts.—A special feature of the *Mauretania* was the installation of electric lifts, of which there are no less than nine—two passenger, two baggage, two service, and three food lifts. The passenger lifts travel a vertical distance of 36 feet at 150 feet per minute and are capable of carrying eight to ten persons. The baggage lifts are larger but somewhat slower in running.

It is impossible to deal in detail with the great amount of varied machinery installed in the *Mauretania* apart from that concerned with propulsion. There are the powerful engines which operate the rudder; the host of ventilating fans, from the huge pressure blowers to the 12-inch cabin desk fans; the cargo winches; refrigerating machinery for the preservation of the ship's stores, and pumps in their legion—bilge pumps, ballast pumps, wash-deck pumps, etc. The machinery for heaving up the anchors and the mechanism for firmly holding the cables when anchored are in themselves a highly specialized and powerful equipment.

Cables.—A most important part of a vessel's equipment are the anchor cables, especially when they have to hold a vessel the great size of the *Mauretania* against the force of the wind and stream. Those manufactured for her were the largest ever made for the purpose and were considerably larger and stronger than those supplied to H.M.S. *Dreadnought,* then the largest warship in the world.

Each link is 22½ inches long, 13½ inches wide, 3¾ inches in diameter, and weighs 170 lb. A three-link sample stood a test of 350 tons. The total length of cable is 1,900 feet and, with the joining shackles, weighs 130 tons. Each anchor shackle for securing the cable to the anchor tips the scale at 7 cwt. 1 quarter 2 lb. The anchors themselves weigh 10 tons each.

CHAPTER III

LAUNCH AND TRIALS

THE firm to whom was entrusted the building of the *Mauretania* had been in existence for some years previous to 1880 as C. S. Swan & Company, chiefly concerned with the building of small sailing ships. In that year Mr. George B. Hunter became senior partner, and to him more than anyone else was due the remarkable development of the great establishment at Wallsend, near Newcastle.

Mr. Hunter was born in Sunderland in 1845, son of a sea-captain and ship-owner. His first experience of shipbuilding and marine engineering on a large scale was when he obtained, in 1869, an appointment with the famous Glasgow firm of Robert Napier & Sons. After some years with them he returned to Sunderland, and later, in 1880, became partner in C. S. Swan & Hunter.

In 1895 the concern became a limited liability company with Mr. Hunter as Chairman, a link with the old firm being retained by a Mr. C. S. Swan being one of the Directors. It acquired the adjoining old-established firm of Schlesinger, Davies & Company, builders of pontoon docks. Swan & Hunter, while continuing ship construction, concentrated on floating docks and are said to have turned out more than all other firms combined.

In 1903 Swan & Hunter amalgamated with Wigham

Richardson & Company, of Walker-on-Tyne, and also bought up the Tyne Pontoon and Dry Dock Company. It had by then acquired a powerful interest in the Wallsend Slipway and Engineering Company, which by the time of the building of the *Mauretania* had become a controlling interest by virtue of being the largest shareholders. Certain Directors were common to both concerns and, in fact, to all intents and purposes the two firms were one.

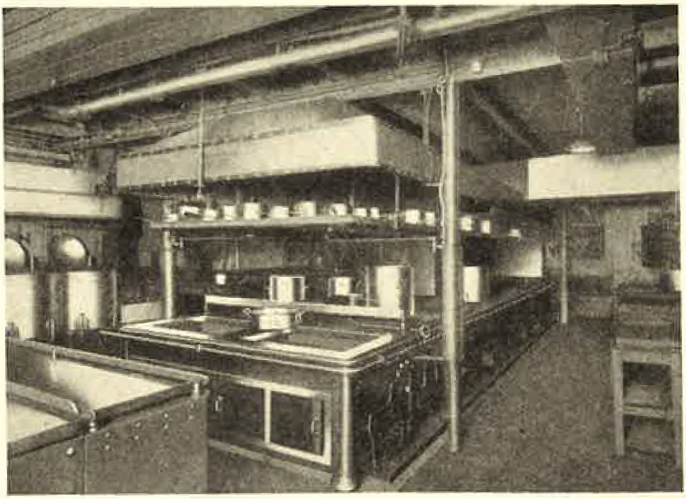
The name of the locality, Wallsend, refers to the great Roman wall, built from the Tyne to the Solway Firth to keep out the terrible Scots, the ancestors of the builders of the *Lusitania*. As happens, the wall terminated at a point enclosed in Swan & Hunter's works, and it was from there that a party of enthusiasts, just before the *Mauretania* was launched, commenced their pilgrimage along the length of the wall.

The construction of the machinery and boilers of the *Mauretania* was in the nature of a sub-contract, entrusted to the Wallsend Slipway and Engineering Company, with whom, as mentioned, Swan & Hunter had long been associated. The Slipway Company had commenced building marine engines in 1875 and have since carried through many important engineering contracts, especially for warships built in the Royal Dockyards.

Mr. Andrew Laing, as Director and general manager of the Slipway Company in 1903, was responsible for the construction of the propelling machinery for the *Mauretania*. He was recognized as one of the leading experts on machinery for large merchant and warships. Before coming to Wallsend he had been for many years with the Fairfield Shipbuilding and Engineering Company of Govan and had engined the

Campania and *Lucania*, the great Cunard record-breakers of 1893.

When the order for the *Mauretania* was received by the builders work was at once commenced. With such a large vessel, whoever the builders may be, there is a tremendous amount of both raw material and special equipment to be ordered from various firms throughout the country. Apart from the ship herself and her main engines and boilers there is the anchor and cables, capstan gear, lifts, pumps, kitchen equipment, and upholstery, all to be obtained from firms who specialize in these products.



THE KITCHEN

One of the most important preliminaries is to safely prepare the site on which the enormous structure, running into many thousands of tons, is to be built, and also prepare the launching ways by which it takes the water. As to the question of the launch, the builders were met with a difficulty, as the River Tyne at the spot where the works are situated is only 785 feet wide, whereas the *Mauretania* would have an extreme length of 790 feet. It was, therefore, necessary to adopt an existing slip so that the launch would be made at an angle and thus utilize a bend in the river. This gave a total clearance of 1,200 feet before the other side was reached, but even then there would not be much to spare.

It is not necessary to narrate the process of the building as we are more concerned in this book with the *Mauretania* as a ship and with her record. But eventually the great day arrived, September 20, 1906, for which the launching ceremony had been fixed. The launching of even a small ship is always an anxious time, probably the most anxious in her career, but with the *Mauretania* it was a very different problem. Her launching weight was no less than 16,800 tons, a weight which never before had been equalled and which exceeded the combined weights of the battleships *Agamemnon* and *Lord Nelson* when they took the water the same year. It would not have been surprising if Mr. Stephenson, who as yard manager was responsible for this particular operation, had spent a restless night on the 19th!

As we have mentioned, even when launched at an angle to the river there was not much clearance to spare, and it was necessary that the great mass should be pulled up as soon as possible. But the " brake " had to be applied gradually, as 17,000 tons, even if travelling slowly, would snap anything if checked with a jerk.

The method adopted was as follows: Attached to the ship were twelve loose, heavy chains, the other end of which were piled up in twelve heaps on the ground, each heap weighing about 80 tons. Thus, as the ship travelled down the launching ways with an accelerating speed, so the retarding effect of the constantly increasing length of the chains become greater. The arrangement worked perfectly and the ship was gently pulled up after having travelled a total distance of 951 feet, and was never for one moment out of control.

The area of the actual bearing surface of the ways was 7,620 square feet and the mean initial pressure per square inch was 2·2 tons. A great amount of lubricant had to be applied to the ways, consisting of 290 cwt. of tallow, 12½ cwt. of train oil, and 22 cwt. of soft soap.

By 4.15 p.m. all was ready. The first item of the actual launch was to knock out the keel blocks, which occupied about 25 minutes, the ship being then held by eight triggers only. The Dowager Duchess of Roxburgh, who performed the launching ceremony, then operated the mechanism which released the triggers and the ship was free. In case she did not immediately commence to move, hydraulic rams, capable of exerting a pressure of 400 tons, had been provided, but these were not required.

As soon as the triggers were released the ship commenced to glide down the ways and took the water without the slightest hitch of any description, attaining a velocity of 14 knots. The whole launch had only occupied 70 seconds, and as soon as she had come to rest stern up-river six powerful tugs immediately got hold of her. She was then towed alongside the shipyard, where the river had been specially dredged to a depth of 31 feet.

The next important step was to place on board the turbines and boilers. The works of the Wallsend Slipway and Engineering Company, where they had been constructed, was about half a mile along the river. For the purpose Swan & Hunter had provided a self-propelling, floating derrick crane of great height and capable of lifting 170 tons, probably the most powerful crane in the world.

Deep Sea Trials.—Within a little more than a year from when she was launched the *Mauretania* was ready for her full power trials. These were not to consist of a dash along the measured mile under specially selected conditions, which gave unlimited scope for artful " jockeying " by any engineer who knew his job. Instead, they were to be under conditions closely resembling what the normal service conditions would be, and consisted of four runs of 300 miles each way between the Corsewell Light and the Longships Light off Cornwall. si, mas 300 millas (recta absoluta, 295)

The *Lusitania*, whose launch had occurred some few weeks before that of the *Mauretania*, had carried out the same strenuous test on July 29, 1907. These had proved eminently successful, the results being as follows:—

	Knots
South from Corsewell	26·4
North from Longships	24·3
South from Corsewell	26·3
North from Longships	24·6

Mean average, 25·4 knots.

The reduced speed on the runs north was due to a north-westerly wind which freshened up during both nights. The trials were carried through without any hitch or difficulty whatever.

As the time for the *Mauretania's* trials drew near great excitement prevailed in Newcastle as to whether she would better the results obtained by the *Lusitania.* A keen rivalry in shipbuilding had always existed between the Clyde and the Tyne, the great shipbuilding centres of Scotland and England respectively, which was raised to fever heat by the fact that the construction of one of these exceptional vessels had been allotted to each river.

The *Mauretania's* deep-sea, full-power trials commenced on November 3, 1907, at 8 a.m., the four runs being the same as for the *Lusitania.* The results, as officially published by the Cunard Company at the time, were:—

	Knots
South from Corsewell	26·28
North from Longships	25·26
South from Corsewell	27·36
North from Longships	25·22

The mean speed for the four runs was 26·03 knots, and it was stated that the maximum shaft horsepower developed was 78,275.

By the evening of the 5th these trials had been completed and the *Mauretania* anchored at Wemyss Bay. On the 6th further trials were carried out on the measured mile at Skelmorlie, a speed of 26·75 knots being attained on the best pair of runs.

Both these series of trials could not be otherwise regarded than an outstanding achievement, a great credit to all concerned. The results were far and away better than the most sanguine had expected, and the distance was sufficient to prove that she could maintain the stipulated speed of 24½ knots and still have an ample reserve in hand. They were carried out strictly under service conditions and no undue driving was indulged in. The air-pressure in the stokeholds was in accordance with specification and the boilers easily maintained an ample supply of steam. All the machinery worked with the utmost smoothness and efficiency.

Thus the *Mauretania* proved the faster not only on trials but throughout their careers. Why this should have been so when both vessels were built to practically the same specification has puzzled many. Obviously, there is some reason for it, which, obviously, is known to the experts, and we may be sure the wiseacres of Tyneside had also their explanation. The phenomenon had often occurred in the history of shipbuilding, even when two vessels have been constructed to the same moulds by the same builders. The *Etruria* was always faster than the *Umbria* and the *Lucania* than the *Campania*; and in the Navy, when a batch of, say, six warships have been built to identical plans and with machinery purposely made so much alike that parts, if necessary, can be taken out of one ship and put into another, yet there is generally one considerably faster than the rest, and generally one which always proves a laggard.

Additional to these full-power trials, other trials were held with the object of ascertaining various data, such as the amount of fuel consumed at different speeds. Such would not be of much general interest, but mention might be made that the steering trials disclosed that with about 15 degrees of helm and at a speed of 15 knots she turned a full circle in 8 minutes, and at 22 knots in half a minute less. This was with all four turbines going ahead and proved that in spite of her great bulk she was extremely handy.

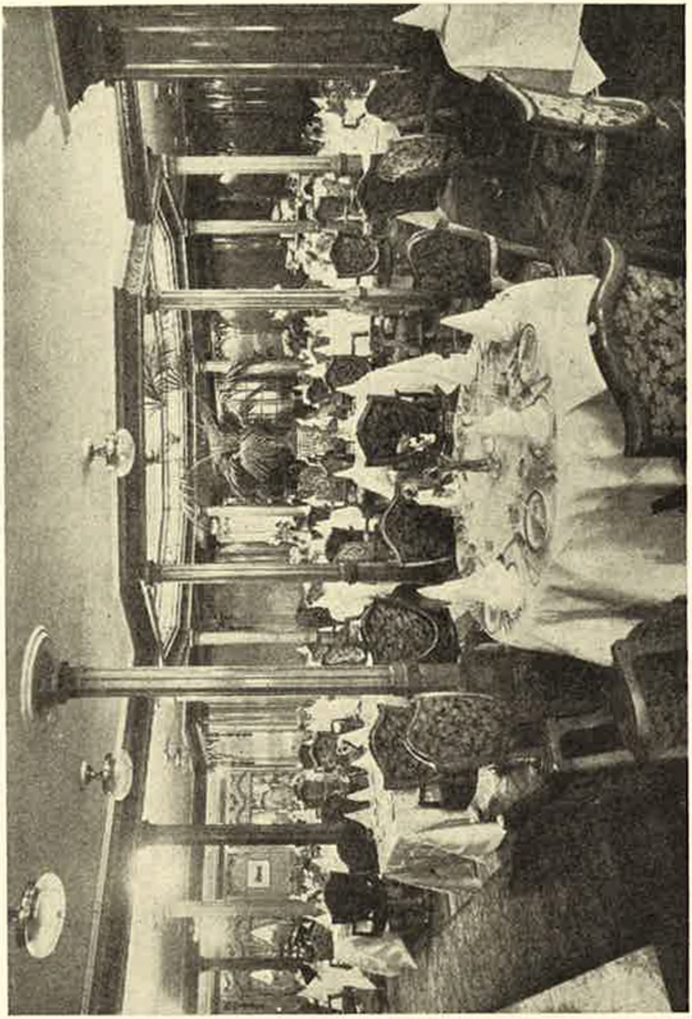
CHAPTER IV

PRE-WAR SERVICES

It was on November 16, 1907, that the *Mauretania* started on her first voyage. A call was made at Queenstown for the mails, and it was on the unbroken run from there to the Ambrose Lightship at New York that the duration of the voyage was then reckoned.

Following the usual custom with vessels newly commissioned she took it easily at first and did the distance in 5 days, 5 hours, and 10 minutes, at an average speed of 22·21 knots. On November 30th she left New York on her return voyage and averaged 23·69 knots to Queenstown, the time being 4 days, 22 hours, and 29 minutes. Thus, going slow and with obviously plenty of power in reserve, she beat all the records that had been made by the German boats, a reply to which was the great reason for her existence.

It was not long before the *Mauretania* and *Lusitania*, the latter having started running a few weeks before the *Mauretania*, commenced to get into their stride on the Atlantic and to show an expectant world what they could do in the way of speed. During 1908 the average speed of their voyages had been gradually creeping up, until, on March 5, 1909, the Cunard Company announced that the *Mauretania* had just completed a Westward crossing in 4 days, 12 hours, and 6 minutes, at a record average of 25·55 knots, with best days' runs of 643, 648, and



THE DINING SALOON

671 miles. This was practically a clear two knots better than the record of the *Kaiser Wilhelm II*, the German record-holder, which had reached 23·68 knots in 1904.

This excess of two knots entailed far more than what might appear from the mere statement. The fight for the supremacy in speed on the Atlantic had for as long as it had existed been of the keenest, and each successive record-breaker had to be the very latest as to machinery and speed design. Yet, any increase of speed had occasionally been as much as a knot, but more frequently only the fraction of one. For these two splendid vessels to gain at a single bound a clear two knots indicated a great all-round advance on their immediate predecessors, the most important factor in which was the adoption of the turbine and the preliminary experiments that had been made with tank models.

On June 21, 1909, the *Mauretania* arrived at Queenstown after a crossing in 4 days, 17 hours, and 21 minutes, at an average for the voyage of 25·88 knots, the previous best being a recent 25·70 knots. During the same year her fifteen outward voyages averaged 25·39 knots and the same number of return at 25·48 knots, a very creditable achievement, as the weather conditions on the North Atlantic were not of the best in that particular year.

It was found that there was a much smaller difference between the *Mauretania's* "best" and "worst" voyages in the same direction than had been experienced with any other vessel on the North Atlantic route. This is a great factor in the satisfactory running of a service, as a day's delay, in addition to upsetting the time-table, may cost a couple of hundred pounds or so. This regularity, in spite of any bad weather, was to be expected from her large bulk, and even if delayed her horse-power would enable her to make up time. Fog, and not any reasonable weather, was the only enemy to her time-keeping.

During 1909 the Cunard decided on Fishguard as their Eastward port of disembarkation for the mails and to ensure an auspicious inauguration a spectacular speed exploit was planned in conjunction with the Great Western Railway. On August 25th, at 10.8 a.m., the *Mauretania* left the Cunard pier at New York, and the G.W.R. train steamed into Paddington with the mails at 6.40 p.m. on the 30th. This exceptional achievement necessitated some very fast work both on sea and land. The Atlantic crossing was made in 4 days, 14 hours, and 17 minutes, and the 261½ miles from Fishguard to Paddington was done in 4 hours and 28½ minutes. Some irritating delay was caused by fog on two days, but in spite of this the average speed of the *Mauretania* was 25·41 knots, equal to 29·27 land miles per hour, and the average speed of the train was 58·4 miles per hour, but on the 77¼ miles from Swindon to Paddington, an exceptionally favourable stretch for speed work, 67·8 miles per hour was averaged.

In September 1910 the *Mauretania* broke all her previous records, and those of the *Lusitania*, by crossing the Atlantic from East to West in 4 days, 10 hours, and 41 minutes, at an average of 26·06 knots, and did the return at an average of 25·61 knots. This 26·06 knots, equal to 30·02 land miles per hour, was the highest average reached by the *Mauretania* before the War, and exceeded under service conditions and for three times the distance the mean speed attained on her trials in 1907, when the conditions as regards fuel, etc., would be as favourable as possible.

It should be understood that when an average speed is quoted for a whole voyage that at times the speed must have been considerably more. With a coal-burning ship, as the *Mauretania* was before the War, the speed is bound to vary. Furnaces have to be cleaned of clinker and ashes got up, and there may be a temporary easing off due to some hitch or slackness in the supply of coal from the bunkers to the boiler-rooms. Again, on the North Atlantic run the greatest enemy to a high average speed is fog, and many a promising Westward run has had its average lowered by a slow down owing to fog when nearing the other side.

Thus, when a high average speed is recorded, say the 26·06 knots of September 1910, it can safely be taken that at times during the run the speed was half or even a knot more and for several consecutive hours. Two typical instances of this can be given. Early in March 1910, when nearing Fishguard, the *Mauretania* did a burst at 27·48 knots, and in the May of the following year averaged 27·04 knots for a whole day's run.

Another smart performance is worth quoting. On Saturday, December 10, 1910, she left Queenstown at 5.43 p.m. and arrived New York on Friday, the 16th, at 6 a.m. English time. She sailed again 41 hours later and reached Fishguard on Thursday, December 22nd, at 10.22 p.m. She thus accomplished the remarkable feat of twice crossing the Atlantic in 12 days and a few hours, which included the " turn round " and coaling at New York.

It is, indeed, a very true saying that speed at sea is costly. At first it may appear that to shorten

THE SMOKING-ROOM

a voyage would lead to economy in catering for the passengers and crew and may enable the vessel to get one or maybe two extra voyages in during the year. But any such economy would be more than counter-balanced by the enormous cost of excessive speed. A reference to Chapter II will show the large number of engine-room staff the *Mauretania* had to carry, and it was not only a question of their wages, but their food and the accommodation they occupied. As to the actual quantity of fuel consumed. On a normal high-speed run, with most of her boilers lit up and the 180-odd furnaces going full blast, it was found that she consumed about 1,000 tons of coal, not per voyage, but per day of 24 hours. Stand on a railway platform and count a train of 100 normal 10-ton coal trucks go by!

Very few beyond those acquainted with ships and shipboard routine realize the enormous and varied amount of work that is constantly being done every hour during a voyage of a large liner. Three chief departments are concerned with the safety and running of the ship: the navigation, the engineering, and what we can well term the hotel departments. Two of them never sleep, the third only partially and not for long. They are independent in their working and to a certain extent unconcerned with any troubles of the others, yet united in their objective in keeping the great ship functioning as smoothly as possible.

Thus at any given moment it might be quite possible for the officer of the watch to be anxiously waiting as to whether the ship to which a couple of fog-dimmed, will-o'-the-wisp lights belonged will conform to the recognized Rule of the Road or try out a new one of her own; for the chief engineer and his staff to be concerned as to a threatened hot bearing or an important but obstinate pump, and for the *chef* to be quizzingly tasting his latest in soups—*crème à la Mauretania*—to ensure its delicate flavour meeting with the approbation of the epicures in the saloon.

To liken a modern liner to a floating hotel is hackneyed enough. But that is only half the story. The colossal hotel, capable of accommodating two to three thousand guests, with its social gaiety and an acme of luxury, is rushing across half the globe, through the sunshine of day and the darkness of night, through calm and blizzard, relentlessly driven by an enormous energy generated within her and at the average speed of a respectable railway train; instancing in her size, mechanical cunning, luxury, and speed the finest example of man's concentrated ingenuity and industry that can be found.

Up to 1914 the express service of the Cunard had been carried on by the *Mauretania*, *Lusitania*, and the older *Campania*, the *Lucania* having been off service for some years. But by then the *Campania* had become somewhat out of date both as regards speed and accommodation, and in that year she was replaced on the express run by the *Aquitania*, just completed by Messrs. John Brown & Company.

The *Aquitania* is—for she is still running as well as ever—larger than the *Mauretania*, and has, perhaps, more modern accommodation, but makes no attempt to rivalry in speed. Her length is 868½ feet by 97 feet beam, with a gross tonnage of 45,648. She is driven by quadruple turbines of a collective shaft horse-power of about 60,000. Steam is generated at 195 lb. by 21 double-ended boilers of a total heating surface of 138,596 square feet. When she was reconditioned in 1920 after War service she was converted to oil fuel and subsequently reached the highest speed ever attained during her career, viz. 24·5 knots for a portion of an Eastward voyage at an average of 23·62 knots. She was designed on somewhat similar lines to the *Mauretania*, the four well-raked funnels being a distinctive feature, together with the elegant " counter " stern.

From 1907 to 1914 the *Mauretania* and *Lusitania* were veritable Queens of the Atlantic. Year after year they ran with a regularity, a freedom from breakdown, and a full passenger list, a source of justified pride to their owners, designers, and constructors. As a combination of size, luxury, and, above all, speed, they stood out by themselves. The North Atlantic route had always been famous for historic pairs, but never was there a pair as this. They not only staggered creation; they stunned it. No competitor as regards speed was laid down or even contemplated, and it appeared that they would continue undisturbed in their dignified supremacy for as long as ships do last.

But the War intervened.

CHAPTER V

POST-WAR SERVICES

SOON after the outbreak of hostilities the *Mauretania* was requisitioned by the Admiralty, but a doubt arose as to on what particular duty these very large vessels could most suitably be employed. They would require large quantities of coal and be very conspicuous wherever they went. As long-distance transports, say to South Africa, they would prove ideal, but it was not until the Gallipoli campaign commenced that it was necessary to convey large numbers of British troops any distance.

By early 1915 she had been converted into a transport and made three voyages to Gallipoli with 10,391 troops. In September of the same year she was fitted out in a truly magnificent manner as a hospital ship and brought 6,298 wounded from Mudros to England. In early 1916 she was again trooping, this time across the Atlantic, and carried 6,214 Canadian troops from Halifax to Europe.

During 1917 she was laid up at Greenock, but on America coming into the War vessels capable of carrying large numbers of troops were urgently wanted and the *Olympic* and *Mauretania* were so employed, the latter making seven voyages from New York, carrying in all 33,610 United States soldiers. After the Armistice she was repatriating American troops until the conclusion of her Government service on May 27, 1919. In all during the

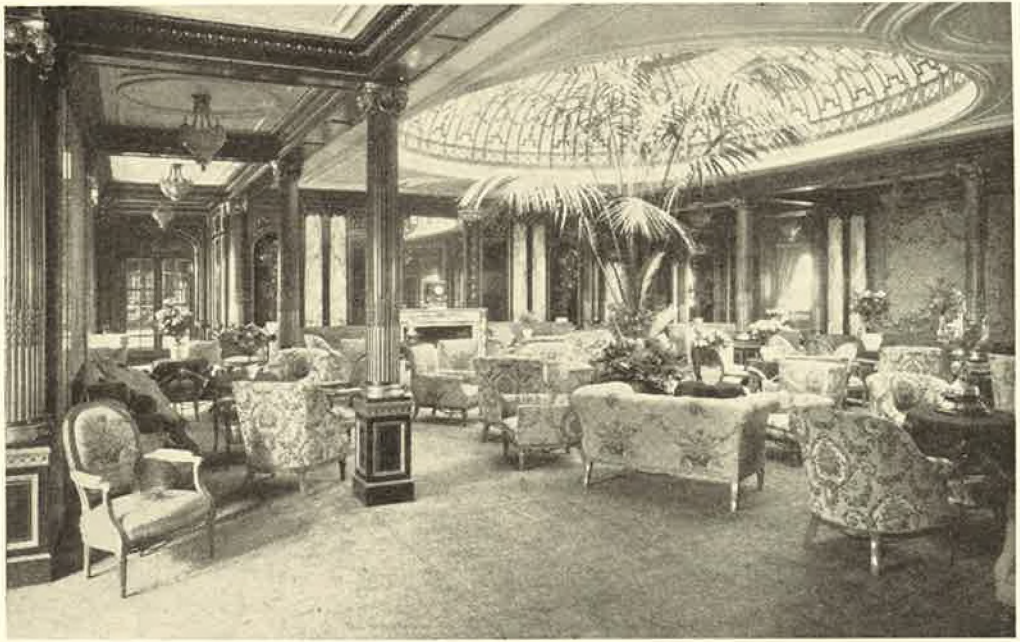
War she carried 8,655 medical staff and wounded and 69,751 troops.

It was no doubt a sore point with the Germans that the *Mauretania* safely lived through the War, the best of the two vessels that had so badly beaten their four-funnelled flyers of the early nineteen hundreds. Captain Rostron, who was in command of the *Mauretania* for most of her hostility sea-time, says, in his very interesting book, *Home from the Sea*, that she appeared to bear a charmed life, and that although she was frequently in the danger zones and that although other vessels in close proximity were attacked, yet while he had charge of her nothing of the kind was ever attempted.

During 1921–22 the *Mauretania* received an extensive refit at the yard of her builders, Swan, Hunter & Wigham Richardson. The opportunity was taken of introducing several new features in the accommodation so as to bring her into line with current practice. The whole of the furniture in the public rooms was modernized and the magnificent panelling and carving, which had been carefully protected during war-time, was opened up and renovated.

The opportunity was taken to carry out a very important piece of work, the conversion of her furnaces to burn oil instead of coal as hitherto. As oil is a foreign product, has to be shipped from afar, and is ton for ton considerably dearer than coal, it may possibly appear strange that so many fast Atlantic liners use oil fuel, and that with many the great cost of conversion has been incurred.

Without entering into technicalities the advantages are: (1) rapidity of bunkering, with no dislocation of any other work on board; (2) considerably less number of stokehold hands; (3) ability to maintain



THE LOUNGE

a high speed longer, as in a coal-burning ship it is that the men become tired and not the machinery that causes the speed to slacken.

Capacity was arranged for about 5,350 tons of oil, the wing water-tight compartments, previously used as coal bunkers and which extended for the full length of the boiler rooms, being converted to oil fuel tanks, thirty in all. One tank in each boiler-room is arranged as a settling tank to which the fuel is transferred from the remaining, or storage, tanks. Each settling tank is provided with heating coils to bring the fuel to a suitable degree of viscosity before being pumped under pressure to the burners in the furnaces.

The general refit and fuel conversion was completed early in March 1922 and she left the Tyne on Saturday the 19th for Southampton, where she arrived on the Monday and dry-docked, test trials of the new installation being carried out on the way. On Saturday, March 25th, she sailed on her first voyage as an oil-burner to New York.

Those who expected that after conversion she would prove faster than ever were not disappointed. The average speed of her voyages showed a distinct tendency towards improvement, and in August 1924 she again beat all her previous records. The outward voyage from Cherbourg was not out of the ordinary, 5 days, 3 hours, and 20 minutes, with an average of 25·6 knots, but on August 20th she passed the Ambrose Lightship at New York on her return and arrived at Cherbourg in 5 days, 1 hour, and 49 minutes, at an average for the voyage of 26·25 and for the best day's run of 27·05 knots.

When the Cunard resumed their New York express service after the War they only had the *Mauretania* and *Aquitania* available. In accordance with the peace terms Germany had to surrender nearly all her merchant tonnage of any consequence and the Cunard received, via the Shipping Controller, the great ex-Hamburg-America *Imperator*, the *Berengaria* of to-day.

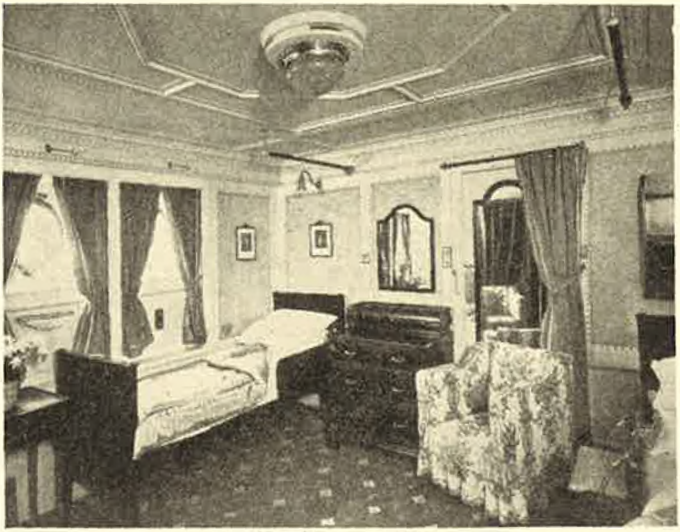
This very fine vessel had been launched in May 1912 by the German Emperor himself and created quite a stir throughout the world as being by some considerable margin the largest and most luxurious liner afloat. She is to-day second only to the great *Majestic* in respect of gross tonnage.

The *Berengaria* has a length of 883 feet, a beam of 98¼ feet, and a gross tonnage of 52,226. She is quadruple-turbine-driven, the total shaft horse-power being 76,250. Steam at 235 lb. is generated by forty-six Yarrow pattern small tube boilers of a total heating surface of 203,000 square feet. As a coal-burner she stowed the great quantity of 8,500 tons, but was converted to oil fuel when transferred to the Cunard, of which she now carries 6,200 tons. Her designed normal speed was 23·5 knots, which since conversion may have been slightly exceeded.

When the *Mauretania* had been converted to oil one feature became very apparent, viz. given normal weather the remarkable similarity in time taken on the same run. With the absence of any manual labour on the fuel on its journey from the tanks to the burners this was to be expected, but even then the results were most striking. Captain Rostron has stated that on four Eastward consecutive voyages the difference of the times of arrival at Cherbourg did not amount to 10 minutes, and that after having travelled at practically a rate of 30 land miles per hour for a distance of 3,000-odd miles.

During 1928 the *Mauretania* put up another most creditable performance, an outward voyage from Cherbourg at an average of 25·63 knots, and on the return, New York to the Eddystone, averaged 26·20 knots, the time taken being 4 days, 21 hours, and 44 minutes.

By June 1929 the great post-war, much belauded German *Bremen* was ready to sail on her initial voyage. As it is always as well not to drive a new vessel until she has settled down, nothing very much was expected. But if her first outward voyage was not spectacular it was highly satisfactory, averaging out at 27·83 knots. She did better still on the return with 27·91 knots, the best day's run during the double journey being 713 miles.



A Bedroom

Whether this challenge prompted the Cunard to put the *Mauretania* right at it or not is only known to a few, but within a week or so she accomplished the most remarkable achievement of her remarkable career. When Captain McNeil broadcasted on the subject of this voyage he stated that no attempt was made to beat the *Bremen,* but simply to try out some improvements that had been made to the fuel pumps and condensers. This is rather similar to what so often occurred in the nineties, when the contest for the Blue Riband was particularly keen, and when each victorious record-breaker announced—between pants—that there had been no suggestion of racing and that, in fact, she had been supinely oblivious to a rival that had been nearly bursting herself a few miles astern for most of the voyage.

We might mention that the *Mauretania* herself took a share in this broadcast talk, a personal good night, by sounding three blasts on her siren.

As to the *Mauretania's* great achievement. She left Cherbourg on August 3rd and arrived off the Ambrose Lightship in 4 days, 21 hours, and 44 minutes, at an average of 26·85 knots. On the return she left New York on August 16th and arrived at the Eddystone in 4 days, 17 hours, and 50 minutes, at the phenomenal average speed for a vessel 22 years old of 27·22 knots. The best day's run, on August 5th, was done at an average of 27·48 knots, the distance logged being 687 miles.

Not content with this remarkable feat she topped it off with the run from Eddystone to Cherbourg, 106 miles, at an average of 29·7 knots, during which she was at times travelling at 30 knots or more. The brilliance of her Eastward crossing and the subsequent shorter run to Cherbourg needs no laudation, the facts speak for themselves, but it should be emphasized that she had the same engines and boilers as when launched nearly a quarter of a century before!

A word as to the *Bremen* might be of interest, as any comparison between the vessel of 1928 and the veteran of 1907 can but accentuate the wonderful August performance of the latter. The German vessel was launched in August 1928 and is 870 feet long by 101½ feet beam, with a gross tonnage of 51,658. As to her absolute horse-power and speed, a certain amount of secrecy exists, but it was semi-officially given out at her launch that she was designed for a normal service output of 110,000 shaft horse-power, with a maximum of 130,000. Steam is generated by eleven double-ended and nine single-ended boilers of a heating surface of 223,240 square feet at a pressure of 330 lb., and superheated to 660 degrees C.

Obviously, she has all the great advantages that progress and a modern design can bestow. Boilers built for, not converted to, oil fuelling; higher steam pressure; turbines which drive through gearing and not direct, and a far greater shaft horse-power.

The *Bremen's* most recent exploit was in June 1933 when she arrived at Cherbourg after completing the run from New York in 4 days, 16 hours, and 15 minutes, at an average of 28·51 knots. But this record did not remain long undisturbed, for in the following August the great Italian *Rex*, of 51,075 gross tons and a maximum shaft horse-power close on 140,000, crossed from Gibraltar to New York in 4 days, 13 hours, and 56 minutes at an average of 28·92 knots, with a best day's run of 29·61 knots for a distance of 736 miles.

The Verandah Café

Perhaps many, especially sailors, will consider that the finest achievement to the credit of the *Mauretania* was that when she arrived at Cherbourg in August 1930 she had completed thirty-eight successive runs across the Atlantic at an average speed for each voyage of not below 25½ knots and for several of them considerably more. This was, indeed, a supreme test, as it was accomplished at all times of the year, in all weathers, and with an absence of mishap that is almost uncanny.

As to the future. It is very improbable if the *Mauretania* will ever better her wonderful performance of August 1929. The days of miracles are gone and it is expecting too much to pit a war-worn veteran, now twenty-seven years old, against such up-to-date specimens of the shipbuilder's art as the *Bremen* and *Rex*. If any miracle attaches to the *Mauretania* it is in what she has done, and which, it is safe to say, no other steamship will ever equal.

Even if the machinery of the *Bremen* and *Rex* has not yet been opened out to its utmost capability their speeds, dazzling as they are, will be eclipsed by those of the still unnamed Cunarder, yard number 534, now on the stocks, and the recently launched French *Normandie*. Not much reliable detail as to these has been disclosed, but their tonnage will be in the region of 73,000 to 75,000 gross, with a horse-power round about 200,000, while it will not be too much to presume that their speeds will be at least 30 knots on normal service with a maximum of 32 to 33 knots for some hours.

It would perhaps assist to a proper appreciation of the great prominence of the *Mauretania* in the recent development of speed on the Atlantic to tabulate the progress made by the various record-breakers since the advent of the *Campania* and *Lucania* in 1893, the speeds quoted being the best voyage average made by the vessels named.

Date	*Name*	*Best Average on Voyage* Knots
1893–1897	*Campania* and *Lucania* ..	22·01 in 1895
1897–1907	Four German vessels ..	23·68 in 1904
1907–1929	*Mauretania*	23·69 first voyage 26·06 in 1910 26·25 in 1924 27·22 in 1929
1929–1933	*Bremen*	27·91 first voyage 28·51 in 1933
1933	*Rex*	28·92 in 1933

Those who have had the patience to reach so far in this little book can surely be in no doubt as to what a very remarkable vessel the *Mauretania* has proved to be, but should any uncertainty remain, it will be dispelled by the fact that only last year, that is twenty-seven years after her launch, she accomplished the respectable distance of one hundred miles in less time than she ever has done.

No question can arise as to this wonderful achievement being absolutely authentic. The details are taken from an official log card printed on board at the time and kindly lent by the Cunard Company.

She left Havana on July 19, 1933, and up to noon on the 20th had travelled 603 miles, at an average speed of 27·78 knots. The best rate of steaming was between Carysfort Reef Lighthouse and Jupiter Inlet Lighthouse, 112 miles, at an average of 32 knots, or 36·84 land miles per hour.

~ El capitán Sir Arthur Henry Rostron, K.B.E., R.D., R.N.R., Chalk Hill, West End, Southampton, que mandó el "Mauretania" y fué Comodoro de la Cunard Company desde 1º agosto 1928, falleció el 4 de noviembre de 1940, a la edad de 71 años. Left £ 9.347 gross; net personalty £ 6.427. ~ (Véase una nota que hay al principio sobre el capitán A. T. Brown, último que tuvo el "Mauretania".)

CHAPTER VI

TWO MEN OF THE "MAURETANIA"

A BOOK on the *Mauretania* would not be complete without a reference to two men whose names are household words to thousands of transatlantic travellers, and who for many years were so closely associated with the famous vessel. We refer to Captain Sir Arthur H. Rostron, K.B.E., and to Mr. Andrew Cockburn, her Chief Engineer.

Some poetically inclined folk say that an affinity grows up between a ship and the man she knows, and that she will do for him what she will not do for others, and they quote the erratic conduct of several of the racing clippers in support of their theory. Whether this affinity applies to steamships as well as to sailing-ships has not been stated, but if ever it did, then it surely existed between the *Mauretania* and the two men we have mentioned. Captain Rostron commanded her for eleven years, during peace and war, and Mr. Cockburn was her Chief Engineer for thirteen years.

Captain Rostron was a "*Conway* Boy," in which training-ship he learnt the rudiments of his profession. He gained his early sea-training in sail, mostly in that very fine, full-rigged clipper *Cedric the Saxon.* While in sail he passed the necessary examinations for second and chief officer, and after a voyage or two in steam he secured his Master's ticket.

He joined the Cunard service in 1895 as fourth officer of the *Umbria,* in which he made four trips. He was then granted leave to undergo his qualifying training as a Reserve officer in the Royal Navy. On rejoining the Cunard he was posted to the *Aurania* as extra second, and in a little while was promoted first officer.

In 1901 he was appointed to the *Pannonia* as Chief Officer, and from her to the *Etruria* for a brief spell, and then to the *Campania.* Captain Rostron is one of those courageous seamen who are not afraid to say that they have seen the sea-serpent, and it was while in the *Campania,* in broad daylight and with another officer on watch, that the incident occurred, which he fully relates in his book, which we have already mentioned. Many are of opinion that the existence of the sea-serpent is extremely unlikely, but for an intelligent officer of an important line to solemnly state that he had actually seen it when he had not is surely far more unlikely!

From the *Campania* he was appointed as stand-by officer to the *Lusitania,* then completing on the Clyde; but he did not make a voyage in her, as in August 1907 the great day arrived when he was given his first command, the *Brescia,* the newest and best of the Cunard cargo fleet, and engaged in the company's Mediterranean trade.

From the *Brescia* he went to the *Veria, Paria,* again to the *Pannonia,* and then to the *Carpathia.* It was while in the latter ship that Captain Rostron's name became known throughout the world. He had left New York April 11th, 1912, on a voyage to Gibraltar and the Mediterranean when at [illegible].30 a.m. on the 14th was received the S O S from the *Titanic,* which message the wireless operator of the *Carpathia* had received while he was undoing his boots preparatory to turning in, but luckily had not taken off the earphones.

The news was at once reported to Captain Rostron, who immediately consulted the Chief Engineer, and an extra watch was put on in the boiler-rooms. The *Carpathia* was a 14-knot boat, but for 3½ hours that night she steamed at 17 knots. The race to the stricken vessel was only a short one, but one full of hazard, as a great amount of dangerous floating ice was known to be in the vicinity, and before the first boat was sighted icebergs were reported and had to be avoided. At length a green flare was seen, but no sign of the *Titanic.* At 4.0 a.m. the engines of the *Carpathia* were stopped alongside the first boat.

A cold dawn was just breaking and disclosed icebergs for as far as the eye could reach. One by one the boats were cautiously approached, and altogether 706 survivors were rescued. At about 8.0 a.m. another ship was seen to be coming towards them, the *Californian,* and was asked by signal to continue the search, as the *Carpathia* was about to make for New York.

But the return voyage was still difficult and dangerous, as ice was encountered for some distance, and when nearing land a dense fog slowed down speed considerably, when the constant use of the siren must have racked the nerves of the survivors. At last New York was reached and the *Titanic's* passengers landed, loud in their praises of the arrangements that had been made for them in the *Carpathia* by every one of the ship's company.

Having refuelled and filled water-tanks, the interrupted voyage to Europe was continued. Captain Rostron had to attend the Court of Inquiry in London, and was then granted some weeks of leave. He was invited to Washington to receive from the hands of President Taft the Congressional Medal of Honour, the highest honour the United States Government can bestow, and was also granted the American Cross of Honour. He returned to England as a passenger in the very *Mauretania* which he was so soon to command for so long and through such anxious times.

Just prior to the outbreak of the war he was appointed to the command of the newly constructed *Alaunia*, and he was in Montreal when he received news of the commencement of hostilities. After a couple of voyages across the Atlantic she was put on trooping, and formed a unit of the first great Canadian convoy. Then to India with Territorials, and in March 1915 to Gallipoli.

During September 1915 he was appointed in command of the *Mauretania*, then fitting out as a hospital ship, made several voyages to Gallipoli for wounded, and remained with her until she was laid up in March 1916. Then to the *Ivernia*, *Carmania*, and the *Saxonia*, all trooping. When America came into the war the *Mauretania* was again commissioned, with Captain Rostron in command, and did several voyages with U.S.A. troops, as related elsewhere. He happened to be on an eastward voyage full up with troops when he received the welcome tidings of the Armistice having been signed.

On her return to normal peace duties Captain Rostron was again given command of the *Mauretania*, which he retained until the middle of 1926, when he was transferred to the *Berengaria*, which, being a much larger vessel, was regarded as the highest command in the Cunard's service. On August 1, 1928, he was appointed as Commodore of the Cunard Fleet, probably the highest pinnacle to which a merchant seaman could wish to attain. He commanded the *Berengaria* for four years, and retired on March 31, 1931, thirty-six years after he first donned the Cunard's uniform.

Captain Rostron has been the recipient of many international honours. In 1919 he received the Order of the British Empire, and during 1926 he had the rather rare distinction for a foreigner of having the Freedom of the City of New York conferred on him, and soon after was made a member of the Legion of Honour by the President of France. During the same year he was honoured with a knighthood.

The manner in which he became aware of it was certainly appropriate. One night, on a certain voyage from New York, he had not turned in owing to fog, and about midnight the wireless officer came up to him with the news for the daily paper printed in the ship. This rather unusual proceeding led him to suspect that something exceptional was in it, and he took it to the chart-room, and then saw his name mentioned. It appears the Prime Minister had written to him, as is customary in the circumstances, to inform him that his name was to be submitted to the King, but the letter had arrived the very day he had sailed.

The person next in importance to the Captain in a ship is the Chief Engineer, whose work and responsibility in any vessel is naturally of great importance, but is ever so much more so in one such as the *Mauretania*, built expressly for speed and with a reputation to keep up. And while on the subject of Chief Engineers it is to be hoped that in this mechanically minded age that they will soon come to be regarded by the travelling public in the manner they so fully deserve.

Without in any way qualifying the absolute and supreme authority of the Captain, yet since the days of sail have gone he has been shorn of half his actual responsibility. When steam first appeared at sea it was as an auxiliary to sail, then the reverse occurred, but now sail is not and could not be set at all. Thus a great amount of the work of the ship has left the deck and gone below. This is shown by the respective personnel. The "sailors" of a large, modern liner number perhaps fifty, whereas the engineering staff run into hundreds. Yet, when some record-breaking passage is made, it too often happens that the Captain is warmly congratulated and the Chief Engineer and his staff forgotten.

By these remarks it is not implied that any jealousy or envy exists between the two branches themselves, the days of that are gone, and the work of each is justly appreciated by the other. But it is evident that the general public have not yet quite realized the very altered conditions.

Further, it is not generally known that the Chief Engineer and his staff are not concerned only with the main engines and boilers. A modern steamship is a mass of machinery, steam capstan and steam-steering gears, electric light plants, ventilating systems, refrigerating machinery, and pumps of every description. And it is more frequently the case than not that these varied bits of machinery dotted about in inaccessible places cause the chief more concern and anxiety than do the main engines and boilers, which, however large, are in the nature of a straightforward job.

The Chief Engineer who was mostly associated with the *Mauretania* was Mr. Andrew Cockburn. He was born at Kelso in 1871, and served his apprenticeship with Messrs. Morrison & Company, of Leith, during which he attended evening classes at Lockes' Engineering Academy. He then went to Messrs. Hawthorn, Leslie & Company, of Newcastle, one of the leading marine engineering firms in the country, and from there joined the shore engineering staff of the Cunard.

His first appointment afloat was as second engineer of the *Lucania* in 1893, and altogether had the distinction of having served at one time or another in five record-breakers belonging to the Cunard. His war experience was certainly exceptional, being senior second engineer of the *Lusitania* when she was torpedoed in 1915, and was Chief Engineer of the *Aurania* when she was torpedoed in February 1918.

In 1919 he was appointed as Chief of the *Mauretania*, and so continued for as long as thirteen years, during which exceptional length of time he must have got to know every nut and bolt in her machinery. With most steamships as they grow older the strain of the work below gets less, that is, unless the machinery has become absolutely decrepit, which is seldom the case. But with the *Mauretania* the reverse occurred. Her machinery was constantly being improved and gadgets added here and there, and she was constantly being asked to do more and more, until in 1924 she put up that record from New York to Cherbourg at an average of 26·25 knots, and in 1929 that memorable run at 27·22 knots in the same direction.

At the end of 1932 Mr. Cockburn retired to his well-earned leisure, after having served for forty years with Britain's premier steamship line. At one time he was Vice-President of the Institute of Marine Engineers.

* * * * *

In conclusion it would only be just to draw attention to the magnificent rôle played by the great Cunard Company in the history of the Atlantic Ferry. It was the Cunard that in 1840 first established a regular service. It was the Cunard that met and defeated the challenge of the heavily State-aided American Collins Line. It is true that for some years previously to 1884 the Company had held aloof from the keen competition in speed that then existed, but with the *Umbria* and *Etruria*, and later with the *Campania* and *Lucania*, it regained the honours. When the Germans so successfully entered the lists in 1897 with the first of their great four-funnelled fliers, it was to the Cunard that Britain looked, and was soon gladdened by the beautiful *Mauretania* and *Lusitania*. And to-day history is repeating itself in a remarkable manner, and it is sincerely hoped by everyone interested in British shipping that the worthy and friendly rivalry of the German *Bremen* and *Europa*, the Italian *Rex* and the French *Normandie*, will cease to exist when the great Cunarder, now No. 534, casts off on her first voyage to New York.

Books for Ship Lovers and Model Makers

The "Cutty Sark."
A complete account of this famous clipper ship, with full drawings, photographs, and instructions for making a perfect scale model. In two volumes, 200 pages each, with plans. Vol. I.—The story of the ship, and model-making details of the hull, bulwarks, and deck fittings. Vol. II.—Masts, spars, and rigging, with the builders' specification of the original ship. Price **7s. 6d.** per volume. Post free **8s.**

English Warships in the Days of Sail.
An instructive review of the changes in warship construction from 1500 to 1850. Illustrated with 24 plates of photographs and drawings. Price **3s. 6d.** Post free **3s. 10d.**

Motor Boating for All.
By A. H. LINDLEY-JONES. Illustrated by R. BARNARD WAY. Deals with Construction, Equipment, and Cruising. Over 150 pages. 73 illustrations. Price **3s. 6d.** Post free **3s. 10d.**

Model Sailing Yachts : How to Build, Rig, and Sail Them.
A practical handbook for model yachtsmen. Illustrated. Price **1s. 6d.** Post free **1s. 8d.**

Model Steamers and Motor Boats: How to Build and Run Them.
110 pages. 90 illustrations. Price **1s. 6d.** Post free **1s. 8d.**

The Model Aeroplane Manual.
A practical handbook on building and flying. Well illustrated. Price **1s. 6d.** Post free **1s. 8d.**

Model Steamer Building: General Construction.
Price **9d.** Post free **10d.**

Machinery for Model Steamers: Engines and Boilers.
Price **9d.** Post free **10d.**

Model Steamer Fittings: How to Make Them.
Price **9d.** Post free **10d.**

Model Sailing Ship Fittings: How to Make Them.
Price **9d.** Post free **10d.**

Books on any Nautical or Engineering Subject supplied to order

---

PERCIVAL MARSHALL & CO., LTD.
66 Farringdon Street, London, E.C.4